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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/044,162	01/11/2002	Shahram Mostafazadeh	NSC1P225R	3102
22434	7590	03/31/2005	EXAMINER	
BEYER WEAVER & THOMAS LLP			PHAM, THANH V	
P.O. BOX 70250			ART UNIT	
OAKLAND, CA 94612-0250			PAPER NUMBER	
			2823	
DATE MAILED: 03/31/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/044,162	Applicant(s) MOSTAFAZADEH ET AL.	
	Examiner Thanh V. Pham	Art Unit 2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 November 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

Claim Objections

1. Amended claim 1 is objected to because of the following informalities: the objection in the Office action mailed 09/21/2004 suggests only "a central opening" being inserted in the claim to prevent antecedent basis without the term "radially" and in accordance with the declaration filed 01/11/2002, it is suggested again that the term "radially" is deleted. Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1, 7 and their dependents are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The negative limitation "whereby exposed portions of the lead frame form the only externally accessible I/O contacts for the package" is opposed to the specification col. 4, lines 36-37 wherein "attaching solder balls or columns to the lower surfaces 114 of the leads 15" is disclosed. Further, new claim 9 recites the step of "applying solder to exposed portions of the leads" which

has no support anywhere in the specification. It is suggested that these two limitations are deleted.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-5, 7 and 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Melton et al. US 5,844,315 in combination with Ogawa et al. US 5,252,855.

Re claims 1 and 7, the Melton et al. reference discloses a method comprises the steps of: forming a flat lead frame 22 including a plurality of leads 13, the lead frame inherently having opposing upper and lower surfaces; mounting the lead frame and an integrated circuit die 12 onto a molding support 38 of flexible polyimide tape having an adhesive coating such that a lower surface of the die contacts the adhesive tape and the die is located in a central opening, and the lower surface of the lead frame also contacts the adhesive tape, col. 2, lines 55-60; forming a plastic casting 21 *using a dispensing approach* over an upper surface of the die and the upper surface of the lead frame; and removing the adhesive tape 38 to expose the lower surfaces of the die and the lead frame, col. 4, lines 66-67.

Re claim 2, the die includes a plurality of die bond pads 36, and the method further comprises the step of electrically connecting each of the die bond pads to a selected one of the plurality of leads 13, col. 2.

Re claim 3, the step of electrically connecting comprises wire bonding, line 60 to col. 3, line 8.

Re claims 4 and 5, the forming the lead frame step comprises etching or stamping a metal sheet, col. 2, lines 43-45.

In the method of Melton et al., the lead frame provides the areas for plurality of bumps 20 to be attached, therefore after removing the adhesive tape the bonding surfaces 30 of the bumps are also exposed.

The Ogawa et al. reference discloses a method, figs. 1 and 3, using a lead frame without attached bumps and, *re claim 9*, "the joining surfaces of the metal members are provided with an anodic oxide film of copper or copper alloy" (col. 2, lines 58-59).

It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the method of Melton et al. with the lead frame of Ogawa et al. because the lead frame of Ogawa would provide the package of Melton et al. with improved reliability (Ogawa's col. 1, line 10). With this combination, the "exposed portions of the leads form the only externally accessible I/O contacts for a resulting integrated circuit package", these only externally accessible I/O contacts at the lower surfaces of the leads would be used to solder the package to the circuit board to electrically connect the package to the circuit board, *re claim 10*.

5. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Melton et al. in combination with Ogawa et al. as applied to claims 1-5, 7 and 9-10 above, and further in view of Djennas et al. US 5,474,958.

Re claim 6, the combination does not disclose the formation of the plastic cap using a molding process.

The Djennas et al. reference discloses a method for making semiconductor device having no die supporting surface. One embodiment, figs. 9-10 has no attached bumps on lead frame 12 and no adhesive tape. Another embodiment, figs. 19-20, uses substrate 100 with adhesive tape 148. Both embodiments use molding approach to form the plastic cap. (Applicant also admits this process is prior art in the instant specification, col. 4, line 15).

It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the combination of Melton/Ogawa with the molding plastic on the upper surface of the die and the lead frame as taught by Djennas, because the molding plastic of Djennas would provide the package of the combination with moisture prevention (Djenas' col. 1, line 29).

6. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Melton et al./Ogawa et al. and Djennas et al. as applied to claims 1-7 and 9-10 above, and further in view of Pace US 5,904,499.

Re claim 8, the combination does not teach mounting the package on a circuit board such that the lower surface of the die is in directed contact with a heat sink formed on the circuit board.

The Pace reference claims that its method is better than “conventional ‘cavity up’ packages where the heat has to be removed through the substrate into a printed circuit board”, col. 6, line 64 to col. 7, line 3. It means that the mounting the package on a circuit board such that it is in directed contact with a heat sink formed on the circuit board is well known to those skills in the art.

It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the method of the combination with the board that has a heat sink so that when the package was mounted on the circuit board its die’s lower surface would contact the ‘heat sink’ as a mean to conduct heat out of the package. The use of heat sink (the substrate) in the “cavity up” packaging process is well known to those skilled in the art as taught by Pace.

Response to Arguments

7. Applicant's arguments with respect to claims 1-10 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh V. Pham whose telephone number is 571-272-1866. The examiner can normally be reached on M-Th (6:30-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 571-272-1855. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.


Art Unit: 2823

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

WP

TvP

02/15/2005


George Fournson
Primary Examiner